LEVEL II

Research Memorandum 69-1

COMPARISON OF ASVAB AND ACB SCORES

BESRL
U. S. Army
Behavioral Science Research Laboratory

July 1969

(16) Army Project Number
2Q0621QA722

Differential Classification b-00

(9) Research Memorandum 69-1

(4) COMPARISON OF ASVAB AND ACB SCORES

(10) Roger L. Williamson

Milton H. Maier, Task Leader

(14) BESRL-RM-69-1

(12) 10

Submitted by:
Edmund F. Fuchs
Chief, Military Selection
Research Division

Approved by:
J. E. Uhlaner, Director
Behavioral Science
Research Laboratory

(11) Jul 69

402 797

COMPARISON OF ASVAB AND ACB SCORES

BACKGROUND

The Armed Services Vocational Aptitude Battery (ASVAB) was developed as a result of a joint armed services study in 1966. Comparisons were made among similar tests used by the Army, Navy, and Air Force (the Marine Corps uses Army tests) to screen and classify enlisted input. Tests that were highly correlated[1] with each other in a specific area of ability were considered as interchangeable and were used to construct a single test of that ability. The new tests (each shorter than anv of its parent tests) were put together as a battery--the ASVAB--and then standardized to reflect percentiles in the World War II mobilization population.

The Army tests used in the development of the ASVAB were those of the Army Classification Battery (ACB). Since the ASVAB was designed to be comparable to the ACB, counterpart tests from the two batteries are listed in Table 1. It is possible that the ASVAB will be used operationally instead of the ACB in some circumstances and data on the comparability of ACB and ASVAB scores are essential. The seven ASVAB and ACB tests at the top of Table 1, plus the ASVAB Tool Knowledge test which duplicates coverage of the AFQT, were compared. The Tool Knowledge Test has no exact counterpart in the ACB. The ASVAB Coding Speed Test was not administered to the sample used for comparison, since the Coding Speed Test was taken directly from one of two parts of the ACB Army Clerical Speed Test. The last three ACB tests in Table 1, the General Information Test, the Classification Inventory, and the Army Radio Code Aptitude Test, were of such specialized nature that they were not included in the ASVAB.

SAMPLE AND PROCEDURES

In May 1968, the ASVAB was administered to a sample of about 200 enlisted input at the Fort Dix, New Jersey Reception Station. The ASVAB was administered after the men had taken the ACB. In some cases, scores on counterpart AQB tests were used instead of ACB test scores. Correlation coefficients among the tests of the two batteries were obtained. The sample obtained at Fort Dix was ad hoc and not representative of the entire Army input; the results reported here are suggestive rather than definitive.

---

[1] Correlation of .90 or higher after correction for test-retest unreliability.

Table 1

TEST COMPONENTS OF THE ASVAB AND THE ACB

ASVAB Tests		ACB Tests	
Word Knowledge	(WK)	Verbal	(VE)
Arithmetic Reasoning	(AR)	Arithmetic Reasoning	(AR)
Shop Information	(SI)	Shop Mechanics	(SM)
Automotive Information	(AI)	Automotive Information	(AI)
Mechanical Comprehension	(MC)	Mechanical Aptitude	(MA)
Electronics Information	(EI)	Electronic Information	(ELI)
Space Perception	(SP)	Pattern Analysis	(PA)
Coding Speed	(CS)	Army Clerical Speed	(ACS)
Tool Knowledge	(TK)	General Information	(GIT)
		Classification Inventory	(CI)
		Army Radio Code Aptitude	(ARC)

RESULTS

Tables 2 and 3 display the means, standard deviations, and intercorrelations obtained for all ASVAB and ACB tests except the ASVAB Coding Speed Test. The means and standard deviations are reported in the units in which the batteries were scored--for the ASVAB, in percentile score units; for the ACB, in Army standard score units.

In Table 4, which presents data on corresponding ASVAB and ACB tests, ASVAB means have been converted from percentile scores to Army standard scores for ease of comparison with ACB means. Table 4 shows that four pairs of corresponding tests correlated higher with each other than with any other tests in either battery. The four pairs of tests cover verbal ability, arithmetic reasoning, automotive information, and spatial perception. In a fifth pair of corresponding tests which cover electronics information ($r = .64$), the same situation held except for a slightly higher correlation coefficient of .66 between the ASVAB electronics and automotive information tests. The other two ASVAB tests, Shop Information and Mechanical Comprehension, correlated well with their corresponding tests, but had higher correlation coefficients with other mechanically oriented tests in both batteries. The last column in Table 4 displays generally good agreement between the ASVAB/ACB correlation coefficients obtained in the present study and a set of ACB test-retest reliability coefficients based on a sample of about 400 enlisted input tested at Fort Jackson and Fort Leonard Wood in April 1966.

Table 2

MEANS AND STANDARD DEVIATIONS OF
ASVAB AND ACB TESTS[a]

ASVAB			ACB		
Test	Mean	S.D.	Test	Mean	S.D.
Word Knowledge (WK)	57	28	Verbal (VE)	111	22
Arithmetic Reasoning (AR)	52	25	Arithmetic Reasoning (AR)	106	22
Tool Knowledge (TK)	59	28	Shop Mechanics (SM)	102	18
Shop Information (SI)	61	26	Automotive Information (AI)	103	20
Automotive Information (AI)	61	29	Mechanical Aptitude (MA)	109	19
Mechanical Comprehension (MC)	57	28	Electronic Information (EI)	102	22
Electronics Information (EI)	58	28	Pattern Analysis (PA)	105	23
Space Perception (SP)	57	28	Army Clerical Speed (ACS)	104	21
			Army Radio Code (ARC)	100	27
			Classification Inventory (CI)	89	24
			General Information (GIT)	104	17

[a]Means and standard deviations for ASVAB are in percentile score units; for ACB, they are in Army standard scores.

Table 3

INTERCORRELATIONS OF ASVAB AND ACB TESTS

Test	Intercorrelations[a]																		
ASVAB																			
Word Knowledge	WK																		
Arithmetic Reasoning	64	AR																	
Tool Knowledge	08	16	TK																
Shop Information	28	33	71	SI															
Automotive Information	26	30	67	67	AI														
Mechanical Comprehension	38	50	54	61	57	MC													
Electronics Information	45	49	52	57	66	63	EI												
Space Perception	31	51	35	37	33	56	44	SP											
ACB																			
Verbal	84	60	-00	19	19	28	40	31	VE										
Arithmetic Reasoning	58	75	04	21	19	33	40	33	66	AR									
Shop Mechanics	27	38	47	50	48	50	51	39	30	38	SM								
Automotive Information	22	32	65	63	78	54	62	34	27	30	54	AI							
Mechanical Aptitude	45	54	43	51	49	58	59	42	47	52	67	57	MA						
Electronic Information	34	32	47	47	47	49	64	40	41	33	53	59	60	ELI					
Pattern Analysis	36	55	34	43	38	50	47	60	38	53	56	43	57	47	PA				
Army Clerical Speed	32	46	-10	06	04	13	20	23	41	56	24	15	30	20	28	ACS			
Army Radio Code	28	40	01	10	12	17	17	33	35	42	23	17	32	17	33	35	ARC		
Classification Inventory	30	22	-04	09	05	19	14	13	38	24	21	10	27	21	21	30	22	CI	
General Information	57	48	30	37	42	38	50	31	57	48	45	42	49	43	45	38	26	29	GIT

[a]Decimal points are omitted.

Table 4

MEANS[a] AND CORRELATION COEFFICIENTS OF CORRESPONDING ASVAB AND ACB TESTS

ASVAB		ACB			
Test	Mean	Test	Mean	ASVAB ACB r	ACB Test-Retest[d] r
Word Knowledge	105	Verbal	111	.84[b]	.91
Arithmetic Reasoning	102	Arithmetic Reasoning	106	.75[b]	.85
Shop Information	107	Shop Mechanics	102	.50	.71
Automotive Information	107	Automotive Information	103	.78[b]	.87
Mechanical Comprehension	105	Mechanical Aptitude	109	.58	.74
Electronic Information	105	Electronics Information	102	.64[c]	.68
Space Perception	105	Pattern Analysis	105	.60[b]	.75

[a] ASVAB means expressed in Army standard scores to facilitate comparison with ACB means.

[b] Highest correlation coefficient involving either test.

[c] Highest correlation coefficient involving either test across batteries.

[d] Based on a sample of about 400 enlisted input tested in April 1966 at Forts Jackson and Leonard Wood.

The means of the ACB tests with an academic orientation (VE, AR, and MA) were higher than those of the corresponding ASVAB tests (WK, AR, and MC). The test of spatial ability had the same mean in both batteries. The more specialized tests which measure shop, automotive, and electrical knowledge had higher means in the ASVAB (see Table 4). Since the ASVAB was given within a few hours after the ACB, an order effect may have been in operation for the specialized tests.

The intercorrelations among the ASVAB tests fell into three clusters plus an independent test (see Table 5). The first cluster contained the Word Knowledge and Arithmetic Reasoning tests, with a high correlation coefficient of .84. The WK and AR tests are academic in nature, and they did not correlate as highly with any other ASVAB tests. The second cluster contained the Shop Information, Automotive Information, and Tool Knowledge tests with high intercorrelations of .67 (SI vs AI), .71 (SI vs TK), and .77 (AI vs TK). The SI, AI, and TK tests are oriented toward mechanical knowledge that can be gained through experience in a shop or at home. The tests in this cluster call for recognition of tools, knowing how to use them, and having a working knowledge of automobile engine parts and repairs. The first and second clusters were relatively independent, as shown by the correlation coefficients in Table 5. A third cluster contained the Mechanical Comprehension and Electronics Information tests which had an intercorrelation coefficient of .63, and moderate correlation coefficients with the tests in the other two clusters. Since the MC and EI tests relate in the main to mechanical, physical, and electrical principles and depend to a lesser extent on practical experience, they bridged the gap between the academic content of the first cluster of tests and the mechanical experience of the second cluster. The eighth test, Space Perception, had moderately low correlation with the other ASVAB tests, with coefficients ranging from .31 (SP vs WK) to .56 (SP vs MC). The SP test measures the ability to discern which one of four objects (three-dimensional drawings with designs on the sides) could be made by folding a pattern (a two-dimensional drawing with dotted lines indicating where the folds would be).

The clusters of ACB tests agreed closely with the clusters of ASVAB tests. Table 5 gives a side-by-side comparison of the clusters in the two batteries. The correlation coefficients of tests within and across the clusters formed a pattern, appearing in both batteries, that revealed the separation of clusters 1 and 2, and the bridge formed between them by cluster 3. The pattern of high correlation coefficients within the clusters and generally lower correlation coefficients across clusters emerged in both batteries; the levels were especially low across clusters 1 and 2. The separation of clusters 2 and 3 was less evident in the ACB, where some levels across clusters 2 and 3 were higher than the levels within the clusters.

Table 5

COMPARISON OF CORRELATION COEFFICIENTS OF TESTS
WITHIN CLUSTERS AND ACROSS CLUSTERS
FOR ASVAB AND ACB

Cluster Number	Correlation Coefficients for ASVAB and ACB Tests			
	ASVAB		ACB	
	Tests	r	Test	r
1	WK-AR	.64	VE-AR	.66
2	SI-AI	.67	SM-AI	.54
	SI-TK	.71		
	AI-TK	.67		
3	MC-EI	.63	MA-ELI	.60
1-2 (Across)	WK-SI	.28	VE-SM	.30
	WK-AI	.26	VE-AI	.27
	WK-TK	.08		
	AR-SI	.33	AR-SM	.38
	AR-AI	.30	AR-AI	.30
	AR-TK	.16		
1-3 (Across)	WK-MC	.38	VE-MA	.47
	WK-EI	.45	VE-ELI	.41
	AR-MC	.50	AR-MA	.52
	AR-EI	.49	AR-ELI	.53
2-3 (Across)	MC-SI	.61	MA-SM	.67
	MC-AI	.57	MA-AI	.57
	MC-TK	.54		
	EI-SI	.57	ELI-SM	.53
	EI-AI	.66	ELI-AI	.59
	EI-TK	.52		

An inspection of the intercorrelations among the seven pairs of corresponding ASVAB and ACB tests (Table 3) revealed that the within-battery levels were generally higher than the across-battery levels. The average of the off-diagonal intercorrelations within the batteries was computed and found to be .47. The average across-battery correlation coefficient for non-corresponding tests was .42. The difference of .05 was fairly consistent in both magnitude and direction for all comparisons, regardless of whether or not the comparisons were made within or across clusters. It may appear, then, that an effect due to the proximity of tests in the same battery could be operating to increase the intercorrelations among those tests.

SUMMARY

The Armed Services Vocational Aptitude Battery (ASVAB) was developed in 1966 to bring into one battery similar tests used by the Army, Navy, and Air Force for screening and classifying enlisted input. Since the ASVAB was designed to measure the same attributes as the ACB, and contained parallel tests, a comparison was made of ASVAB and ACB scores for the same men. In general, the comparisons indicated good agreement between the ASVAB test scores and corresponding ACB test scores. Also, the intercorrelations of ASVAB tests were clustered in the same pattern as their ACB counterparts.